



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,766	10/23/2003	Taner Tuken	29766-70637	6720

30450 7590 06/30/2006

CUMMINS, INC.
11 SOUTH MERIDIAN
INDIANAPOLIS, IN 46204

EXAMINER

FREJD, RUSSELL WARREN

ART UNIT PAPER NUMBER

2128

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/691,766

Applicant(s)

TUKEN ET AL.

Examiner

Russell Frejd

Art Unit

2128

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10.23.03</u> . | 6) <input type="checkbox"/> Other: _____ |

In re Application of: Tuken et al.

Examination of Application #10/691,766

1. Claims 1-46 of application 10/691,766, filed on 23-October-2003, are presented for examination.

Claim Rejections under 35 U.S.C. § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.

2.1 Claims 1-46 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The invention claims (claim 26 preamble), "*A method for estimating a set of mathematical model parameters for a mathematical model of a system operating parameter.*"

2.2 MPEP Section 2106(IV)(B)(2)(b)(ii) provides that a statutory computer process is determined not by how the computer performs the process, but by what the computer does to achieve a practical application with a useful, concrete and tangible result. For example, a computer process that simply calculates a mathematical algorithm that models noise is nonstatutory, while a claimed process for digitally filtering noise employing the mathematical algorithm is statutory. The long line of cases in this area that are referred to in MPEP Section 2106(IV)(B)(2)(b)(ii) exemplify this requirement, by utilizing in the claim language, terms such as controlling, executing, changing and removing. In view of the aforementioned requirement and the interim guidelines for 101 eligibility, the Examiner respectfully contends that the claim language of independent claims 1, 26 and 46 do not claim a practical application with a tangible

In re Application of: Tuken et al.

result, that language claiming: (in claim 26) **determining** (emphasis added) a number of system operating conditions; **selecting** a group of matrix cells of a data matrix based on values of the number of system operating conditions; **updating** the selected group of matrix cells of the data matrix based on values of the number of system operating conditions; and **estimating** the set of mathematical model parameters based on the updated data matrix.

2.3 For at least these reasons, the Examiner respectfully posits that the claims of the present invention do not meet the criteria for a statutory process. Accordingly, the claims are determined to be a method for estimating a set of mathematical model parameters for a mathematical model of a system operating parameter, consisting solely of mathematical operations, converting one set of numbers into another set of numbers, whereby the method does not manipulate appropriate subject matter, and thus cannot constitute a statutory process (MPEP Section 2106(IV)(B)(2)(c)).

2.4 The Examiner also posits that the method of the present invention is computer executable software code, or a program per se, consisting of software instructions that implement the method for estimating a set of mathematical model parameters for a mathematical model of a system operating parameter. For at least this reason, the software instructions of the present invention do not meet the criteria for a statutory process.

Claim Rejections under 35 U.S.C. § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

In re Application of: Tuken et al.

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.1 Claims 1-3, 14, 16, 22-29, 34, 36, 38, 45 and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by the article authored by Akin et al., hereinafter Akin, entitled *Rule-Based Fuzzy Logic Control for a PWR-Type Nuclear Power Plant*.

3.2 Akin discloses, in regard to claims 1, 26 and 46, a system for estimating a set of mathematical model parameters [p. 883, col. 1, par. 3], the system comprising: at least one sensor configured to produce sensory data [887, 2, 2]; and a control circuit producing at least one control parameter [884, 1, 5], the control circuit maintaining a mathematical model [883, 1, 3] as a function of a number of system operating conditions [884, 1, 5] including either of the sensory data produced by the at least one sensor and the at least one control parameter as well as the set of mathematical model parameters, the control circuit responsive to the number of system operating conditions to periodically update a group of matrix cells of a data matrix [see Tables I-III], and to estimate the set of mathematical model parameters based on the updated data matrix [886, 2, pars. 2 and 3, "assessing the performance"]. Further in regard to claim 46, see algorithms on [883, 2, 2] and fuel quantity on [890, 2, 1, "fuel node"].

Claims 2, 3, 29, 34 and 38: the control circuit includes a memory device having stored therein the data matrix, the control circuit configured to store the estimated set of mathematical model parameters in the memory device. Both of these features, while explicitly taught by Akin, are deemed inherent to the operation of the controller disclosed by Akin.

In re Application of: Tuken et al.

Claim 14: the at least one sensor configured to produce sensory data includes a fuel collection unit pressure sensor configured to produce a pressure signal indicative of a pressure of a fuel collection unit [884, 1, 5].

Claim 16: the control circuit includes a control circuit configured to calculate an output value of the mathematical model based on the number of system operating conditions and update the data matrix with the output value in response to receiving the number of system operating conditions [886, 2, 4].

Claim 22: the data matrix includes a data matrix wherein each data matrix column is a representation of a range of operating conditions and each data matrix row is a representation of one of an input and output of the mathematical model, the control circuit configured to determine the data matrix column by selecting a column of the data matrix representing an operating condition range including values of at least a portion of the number of system operating conditions [see Tables I-III].

Claims 23 and 24: the control circuit includes a control circuit configured to estimate the set of mathematical model parameters based on the updated data matrix using a regression algorithm, the regression algorithm includes a least squares regression algorithm. [883, 2, 2].

Claim 25: the mathematical model is a fuel quantity estimation mathematical model [890, 2, 1, "fuel node"].

Claims 27 and 28: calculating an output value of the mathematical model based on values of the number of system operating conditions, and updating the selected group of matrix cells of the data matrix with the output value [884, 2, 1; and Tables I-III].

In re Application of: Tuken et al.

Claim 36: the populating step includes populating the data matrix with output values of the mathematical model calculated using the set of stored parameter values [see Tables I-III].

Claim 45: the estimating step includes determining the set of mathematical model parameters based on the updated data matrix using a least square regression algorithm [883, 2, 2].

Claim Objections

4. Claims 4-13, 15, 17-21, 30-33, 35, 37, and 39-44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response Guidelines

5. A shortened statutory period for response to this action is set to expire **3 (three) months and 0 (zero) days** from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see MPEP 710.02, 710.02(b)).

5.1 Any response to the Examiner in regard to this non-final action should be

directed to: Russell Frejd, telephone number (571) 272-3779, Monday-Friday from 0530 to 1400 ET, **or** the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279. Inquires of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist (571) 272-2100.

mailed to: Commissioner of Patents and Trademarks
P.O. Box 1450, Alexandria, VA 22313-1450

or faxed to: (571) 273-8300

Serial Number: 10/691,766

Page 6

In re Application of: Tuken et al.

Hand-delivered responses should be brought to the Customer Service Window, Randolph Building, 401 Dulany Street, Alexandria, VA, 22314.

Date: 24-June-2006

A handwritten signature in black ink, reading "RUSSELL FREJD", written over a horizontal line.

RUSSELL FREJD
PRIMARY EXAMINER